

CLAIMS

What is claimed is:

- 1 1. A process for manufacturing at least one of a pole structure and a coil structure for a magnetic head, comprising:
 - 3 depositing a conductive layer;
 - 4 depositing a photoresist layer on the conductive layer;
 - 5 depositing a silicon dielectric layer on the photoresist layer;
 - 6 masking the silicon dielectric layer;
 - 7 etching at least one channel in the photoresist layer and the silicon dielectric layer; and
 - 9 filling the at least one channel with a conductive material to define at least one of
 - 10 a coil structure, a pole tip structure or both;
 - 11 wherein an aspect ratio of the at least one channel is at least about 7;
 - 12 wherein a grain size of the conductive material is less than half of a smallest
 - 13 dimension of the at least one channel.

- 1 2. A process for manufacturing at least one of a pole structure and a coil structure for a magnetic head, comprising:
 - 3 depositing a conductive layer;
 - 4 depositing a photoresist layer on the conductive layer;

5 depositing a silicon dielectric layer on the photoresist layer;
6 masking the silicon dielectric layer;
7 etching at least one channel in the photoresist layer and the silicon dielectric
8 layer; and
9 filling the at least one channel with a conductive material to define at least one of
10 a coil structure and a pole tip structure.

1 3. The process as recited in claim 1, wherein the conductive layer includes Cu if a
2 coil structure is being formed.

1 4. The process as recited in claim 1, wherein the conductive material includes Cu.

1 5. The process as recited in claim 1, wherein the silicon dielectric layer includes
2 SiO₂.

1 6. The process as recited in claim 1, wherein the etching includes reactive ion
2 etching (RIE).

1 7. The process as recited in claim 1, wherein the masking includes depositing
2 another photoresist layer.

1 8. The process as recited in claim 1, and further comprising removing the silicon
2 dielectric layer.

1 9. The process as recited in claim 1, and further comprising depositing an adhesion
2 promoter layer between the silicon dielectric layer and the photoresist layer.

1 10. The process as recited in claim 1, wherein the conductive layer includes a
2 magnetic material.

1 11. The process as recited in claim 1, wherein the conductive material includes a
2 magnetic material.

1 12. The process as recited in claim 10, wherein the magnetic material is selected from
2 the group consisting of NiFe, CoFe, and CoNiFe.

1 13. The process as recited in claim 1, wherein the coil structure includes a P2 pole tip
2 structure.

1 14. The process as recited in claim 1, wherein an aspect ratio of the at least one
2 channel is at least 7.

1 15. The process as recited in claim 1, wherein a grain size of the conductive material
2 is less than half of a smallest dimension of the at least one channel.

1 16. The process as recited in claim 15, wherein the grain size facilitates the depositing
2 of the conductive material in the at least one channel.

1 17. The process as recited in claim 1, wherein the conductive layer includes an Si-
2 containing material.

1 18. A process for manufacturing a coil structure for a magnetic head, comprising:
2 depositing a conductive layer;
3 depositing a photoresist layer on the conductive layer;
4 depositing a silicon dielectric layer on the photoresist layer;
5 masking the silicon dielectric layer;
6 etching at least one channel in the photoresist layer and the silicon dielectric
7 layer; and
8 filling the at least one channel with a conductive material to define a coil
9 structure.

1 19. The process as recited in claim 18, wherein the coil structure includes a P2 pole
2 tip structure.

1 20. The coil structure formed by the process of claim 1.

1 21. The pole structure formed by the process of claim 1.

1 22. The coil structure formed by the process of claim 2.

1 23. The pole structure formed by the process of claim 2.

1 24. The coil structure formed by the process of claim 18.